

GUIDELINES FOR REMOTE CONVERSATION **Remote meeting.** Remote collaboration meetings can be challenging and frustrating – please be patient and flexible.

Audio/Video. We want to see and hear you, but please only have your mic and video on while you're speaking.

Participation:

- Chat Panel can be used to add comments and questions.
- Hand raise function can be found at the bottom of your Participant panel. Please use the hand raise to get into a queue.

Collaboration tools. We will use MIRO for the breakouts to support small group conversations and promote collaborative work.

Be comfortable. We will take short breaks throughout the meeting.

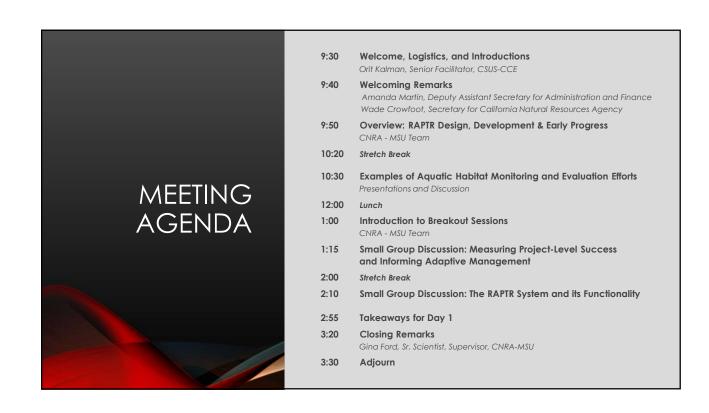
Have fun and be courteous.

- · Honor time and share the airtime
- · Think innovatively We welcome new ideas



Provide a transparent view of the development of the Resources Agency Project Tracking & Reporting (RAPTR) System, and gather stakeholder input to inform the creation of the RAPTR System by:

- 1. Providing clarity on the objectives for the RAPTR System.
- 2. Identifying existing monitoring frameworks, tools, and resources that could help inform the development of RAPTR or be a future opportunity for collaboration.
- **3.** Cultivating a common understanding of ways to assess the performance of an individual project, and how that can be scaled to inform program and agency decision-making.







OVERVIEW: RAPTR DESIGN, DEVELOPMENT, AND EARLY PROGRESS

Gina Ford

Sr. Scientist, Supervisor, CNRA-MSU

Jim Falter

Environmental Scientist, CNRA-MSU

Brad Juarros

Environmental Scientist, CNRA-MSU



MSU – HISTORY AND PURPOSE

MSU was created in 2018 to coordinate project information-sharing across California Natural Resources Agency (CNRA) offices and partner agencies.

To achieve this purpose, MSU will:

- Support the collaboration, coordination, and sharing of information offices under the California Natural Resources Agency.
- Promote consistent data collection and data management strategies for future projects.
- Compile and aggregate data in an accessible, centralized database.
- Inform decision-making for future natural resources investments, policies, and adaptive management strategies.



MSU - EVALUATION FINDINGS

- Monitoring, evaluation, and data management protocols vary widely.
- There is no centralized storage system for postcompletion data that are collected.
- Many offices lack the ability to secure funding for long-term monitoring, operations, and maintenance.
- The return on investment is only deducible at the individual project level and only for a subset of all projects funded.



Before we could succeed with accomplishing the purpose before us, we needed to first really understand what level of monitoring was occurring and how information was being stored. We conducted an assessment of about 400 projects across the state and in most offices. What we found were four main findings shown here.

MSU - RECOMMENDATIONS

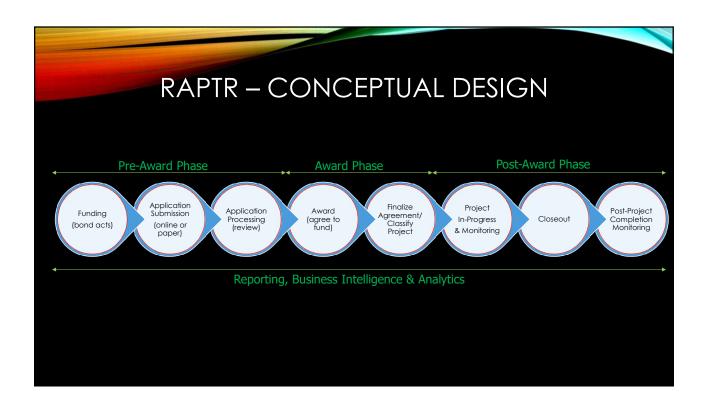
- Develop a centralized tracking and reporting system
- Establish standard protocols for data collection and management
- Provide training
- Leverage existing reporting systems to reduce redundant data entry

MSU - PROCESS

Two concurrent processes:

- 1. Identification of common suites of metrics across CNRA project themes and types for long-term monitoring, post-project completion.
 - Workshops are the start; however, we realize much of the heavy lifting will come through working groups and technical advisory committees with subject matter experts.
- 2. Development of RAPTR a relational database & project management system. Recommendations:
 - 1. Augment existing QA/QC protocols for data entry
 - 2. Provide the requisite training to the personnel responsible for data entry
 - Develop an interface that transfers information across existing databases to reduce redundant data entry by individual users, thereby decreasing the possibility of human error.





This shows a conceptual model of how RAPTR is being designed and built. It includes the general phases of a bond-funded grant as a starting point, however the system is being designed to be readily modified to deal with projects that are funded with other sources, or are not grant-based in nature. Please also make note of the last bubble in the world of project management, this is the "new" piece that we're pushing for. Long term monitoring of projects even after they are complete. As we've learned from our assessment, and shown in the white paper, many of our offices lack a robust grant management system. We intend to provide these services through RAPTR as a means of improving the post-project completion monitoring capacity throughout development.

Increase Transparency

- Improve inter-agency coordination
- Improve accountability
- Justify future votes for bonds by public
- Improved understanding of program and project areas for future funding

Inform Decision-making

- Analytical potential once metrics have been tracked over time.
- Ability to perform analytical evaluations at project, program, agency, regional, or statewide scales.

RAPTR - THE BENEFITS







Improve Effectiveness

- Inform the adaptive management process
- Enhance consistency across and between programs
- Reveal key best practices
- Provide quantifiable data on program outcomes
- Institutionalize follow up

Enhance Collaboration

- Easier means to share/combine information across programs between offices
- Coordinate protocols
- Improve access to grant information for applicants and state staff

Improve Science

- Enhance availability and aggregation of data
- Develop standard metrics and methods
- Improve analytical capabilities of available information
- Identify areas for further study

Enhance Efficiency

- Coordinate resources to streamline efforts for project implementation and long-term monitoring.
- Enhance access to institutional knowledge.
- Leverage existing databases, expertise, and resources.
- · Minimize data entry

RAPTR - CONCERNS NOTED

Logistics & Operations

- Funding
- Staff capacity
- Technical Expertise
- · Work-flow dynamics



Authority & Mandates

- Adversity to change
- Skepticism
- Cost-benefit for RAPTR users vs. non-users

Breadth of projects Number of agencies RAPTR

• Unclear how to do it

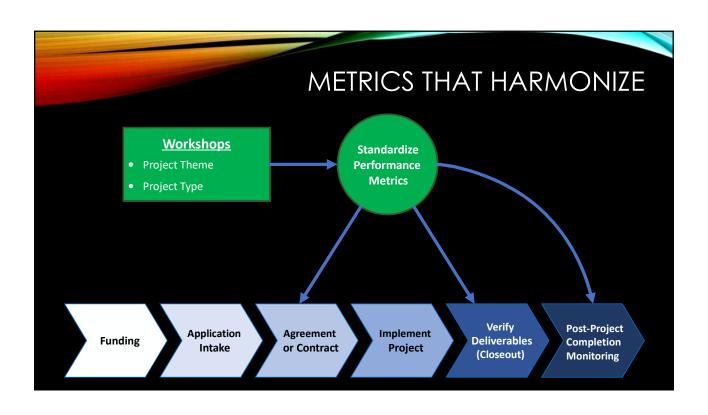
Scope of SystemIt's too hard...

- Which metrics?
- Which methods?
- What work process?









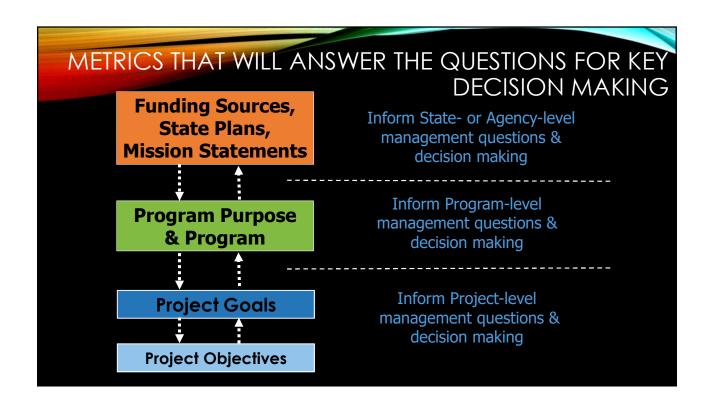
METRICS THAT REFLECT VALUES & PRIORITIES

<u>Values</u>

To restore, protect and manage the state's natural, historical and cultural resources for current and future generations using creative approaches and solutions based on science, collaboration and respect for all the communities and interests involved.

Priorities

Building Climate Resilience | Protecting Biodiversity | Access For All Expanding Nature-Based Solutions | Building Water Resilience | Cutting Green Tape Restoring Forest Health for Wildfire & Climate Resilience | Transitioning to Clean Energy Measuring Progress: Monitoring & Stewardship

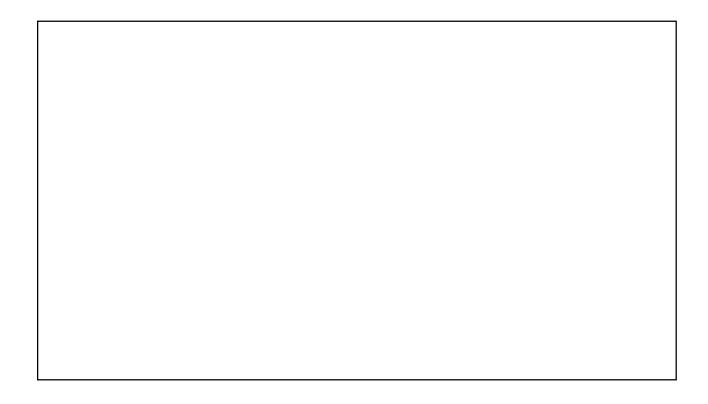


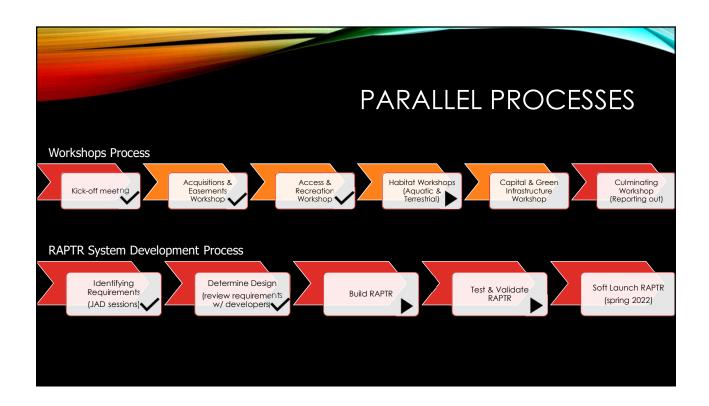
We are interested in metrics reflecting values & priorities, and are also interested in making sure we will answer the key questions for decision making.

RAPTR is being built with considerations for metrics collected from the project level so that the data collected can be used to directly answer project related questions. This information can be analyzed and then extrapolated to respond to program and higher-level state plan and policy questions.

RAPTR will remain a living system, with the flexibility to evolve to add more complex and refined metrics over time, and responding to changes in the "best available science" and management needs.

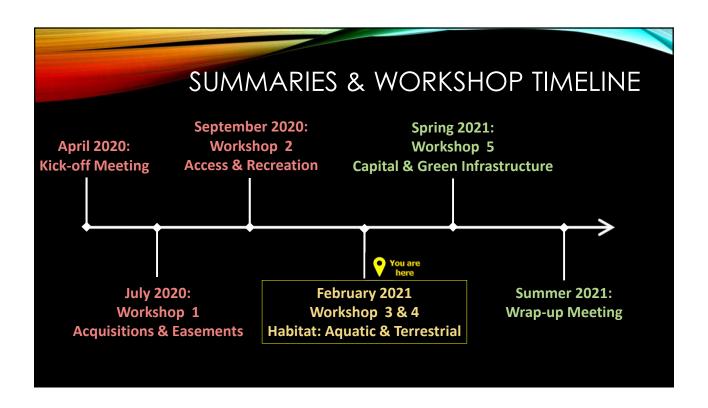






Parallel processes:

- 1) Workshops Process: As discussed in our paper, we are committed to outreach and including stakeholder participation. We feel this is important to allow an opportunity for discussion with you all as future users of the system as to what is feasible and attainable at the project level when it comes to collecting metrics from grantees (or by the granting office).
- 2) RAPTR System Development Process: The "soft-launch" will initially include a voluntary participation. However, the system will include a few key components that will affect all programs:
 - The existing Agency Bonds Consolidated Reporting System for recording relevant bond act financial information, will be enveloped within RAPTR and the information collected therein will continue to be required data entry inputs. So, on some level you will need to interface with RAPTR.
 - Even if programs don't use the project management features of RAPTR we will still need to collect the same information for reporting purposes and such details should at least be available upon request.
 - Regarding long-term monitoring after project closeout/completion, we will be asking for reporting on determined metrics regardless of the platform used to collect such data.



Acquisitions & Easements Workshop (June 2020) – Brad Juarros

Take-away: State acquired land and/or easements are difficult to track information on at this point, and it is a critical piece of information. Point in case, this is critical to the 30 by 30 EO and figuring out how much is already protected is a challenge. After this workshop, Brad has been following up with a working group that developed from the workshop attendees, and this has led to improvements in our current understanding of these projects. Brad has been able to get other Offices to update & improve the information available thru Green Info... CCED (California conservation easement database) and the CPAD (California protected areas database) which house a lot of information. These databases rely on reporting from those involved with land work to update incomplete and potentially inaccurate records, and we have been taking steps to improve this. This improves what is currently available and also will serve to help when we are able to house this information in RAPTR.

Access & Recreation Workshop (September 2020) – Elea Becker Lowe & Rae Eaton (prior CCST fellow) Projects of this nature rely more heavily on surveys and social science to determine the outcome of the project. Did it get used by the intended community? Is it accessible to the people it was designed to support? Are the outcomes what the community wanted? How were the community members engaged in the project design process? This will not be as easy for us to capture in RAPTR, but we have made to sure to allow for uploading surveys and other qualitative information. We have also made note that journal entries by project managers will need to be machine readable to allow for searches and queries in the system. This will definitely improve the use of RAPTR over the long term.





- 1. Cultivating a common understanding of ways to assess the performance of an individual project, and how that can be scaled to inform program and agency decision-making.
- 2. Identifying existing tools, systems, efforts and issues that inform development.
- 3. Providing clarity on RAPTR objectives.



NEAR-TERM WHAT TO EXPECT OF RAPTR AT FIRST

It will include:

- A grant application portal
- Grant application review
- Project management and invoicing features
- Document storage
- Performance monitoring resources
- Analytical opportunities

It will help:

- Consolidate data entry across multiple reporting systems
- Streamline State-funded grant management processes
- Track and evaluate project and program success

THE IMAGINED FUTURE WHAT RAPTR MIGHT HELP WITH

Things it might be able to do:

- Allow for interface and connection with advanced GIS tools; see projects with other relevant information.
- Increase awareness between offices of shared project areas or adjacent projects that can coordinate activities
- Provide ways to look at how projects are helping to accomplish state plans and goals.
- Potentially interface directly with FI\$Cal or other statewide systems, further reducing duplicative data entry.
- A mobile app

Imagine how it <u>could</u> help:

- Further consolidate data entry across even more systems
- Link directly to the State funding opportunity site run by state library
- Track and evaluate project, program, and planning success.
- Allow for easier collaboration between offices – leverage expertise and tools.
- Help to establish baseline data on the status of ecosystems or watersheds.
- Tell the story of what we all do.



implementation and performance data starting with the basic elements of the underlying relational database.

First, I'd like to talk about the overall design of RAPTR and how it will breakdown and organize project

How people describe a project...

'The CNRA Bond Program is overseeing the provision of \$500,000 in funding from Prop 27 to Parks 'R' Us to develop the Natomas Bike Park through the Improving Bicycle Health Program. This project will provide bicycle owners living in and around Natomas with a fully secure recreational area where their bicycles are safe to socialize as well as roam free and unencumbered; thus, greatly improving the health of both bicycles and their owners. Completion of the project will further provide a direct link between two high traffic bike paths used by residential commuters; thus, facilitating a reduction in street traffic around Sacramento as well as a reduction in net city GHG emissions. The first phase of the project will involve the fee title acquisition of four ~0.5-acre vacant residential lots (156-201-0743, 156-201-0744, 156-205-0613, 156-205-0617) which will then be used to develop the bike park. The second phase of the project will involve the development of various park features including a paved high-traffic bike path connecting two existing bike commuter paths, a fully enclosed special-use area for bikes to move unencumbered, and an open covered community shop equipped with permanently secured bike stands and tools. Development of the project will also involve the planting of 50 native trees as part of a broader climate-change resilient landscaping plan. The total cost of the project will be \$1.2 million with additional contributions of \$500,000 and \$200,000 being made from Sacramento Parks and Friends of Natomas' Bikes; respectively. Sacramento Parks will further be responsible for management of the park (including all O&M) in perpetuity following completion of the project.'

Here is an example of how a person might describe a hypothetical project acquiring some residential property in Natomas and developing it into a bike park. It describes all the sources of money funding the project, the purpose of the project, what land will be purchased, and how the subsequent park will be developed.

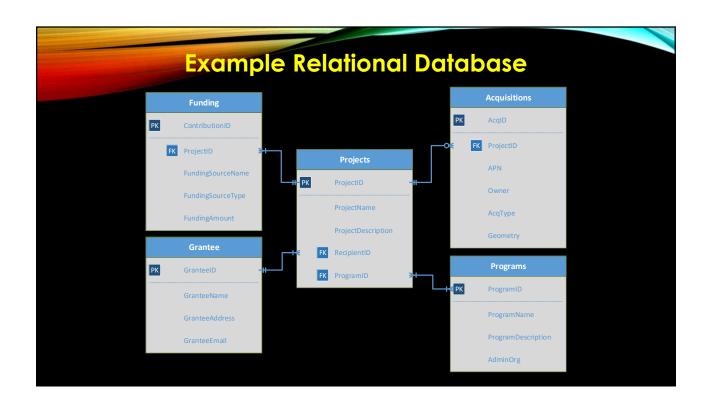
How computers describe a project...

FIELD	VALUE	FORMAT
ProjectID	"CNRA-123-4567"	text
ProjectName	"Natomas Bike Park"	text
GranteeName	"Parks 'R' Us"	text
ProgramName	"Improving Bicycle Health Program"	text
AdminOrg	CNRA	system-defined
ProjectDescription	"This project will provide bicycle"	text
AcqParcels	{156-201-0743, 156-201-0744, 156-205-0613}	text
ProjectArea	2.07 [acres]	number
AcqType	{Fee Title, Fee Title, Fee Title, Fee Title}	system-defined
PropertyManager	"Sacramento Parks"	text
TotalCost	1.2e6 [dollars]	number
FundingAmounts	{5e5, 5e5, 2e5} [dollars]	number
FundingSources	{"Prop 27", "Sacramento Parks", "Friends of Natomas' Bikes"}	text

Here is how a database would describe the same project by parsing it into individual pieces of data assigned to pre-specified data fields. This kind of decomposition of project information will allow us to make more refined queries across thousands of projects based on specific attributes of interest such as...

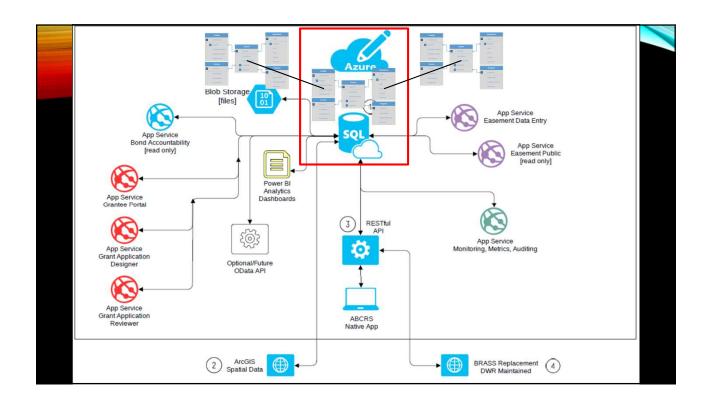
- 1. Which State program funded and managed the project and from what funding scheme did they draw those funds?
- 2. What other State, Federal and non-governmental organizations co-funded the project? And if so, by how much?
- 3. What deliverables and benefits did the project provide? How many other State projects produced the same deliverables or benefits?
- 4. Which State initiative, plan or program objectives was this project trying to serve?

Even though this kind of data parsing is essential for future analysis of state- and Agency-wide project effort and success, RAPTR will also provide staff with the ability to write ongoing narratives of project development in the form of user-composed diaries adapted from a popular feature in the Parks Dept. Grants Management System. This will make it easier for program staff to document the 'narrative arc' of complex project development without having to re-interpret what is happening from the parsed, machine-readable data.

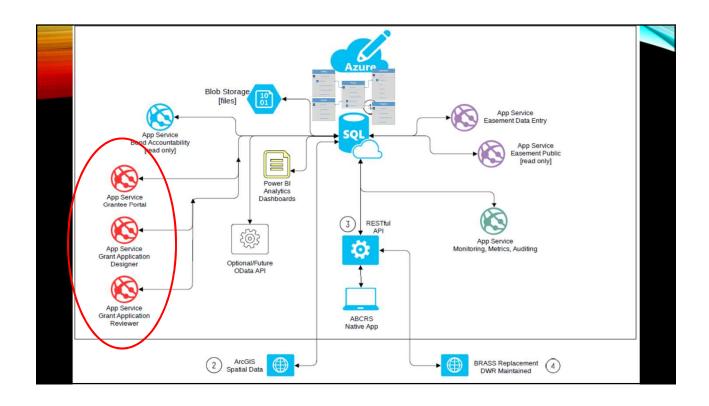


For the next set of slides, I'm going to go beyond the basic process design and dive a little bit into the weeds of RAPTR's architecture simply as a matter of due diligence. However, for those of you who are more concerned with just learning how RAPTR is going to help you with your work, I'll be returning to the more user-focused benefits in a moment.

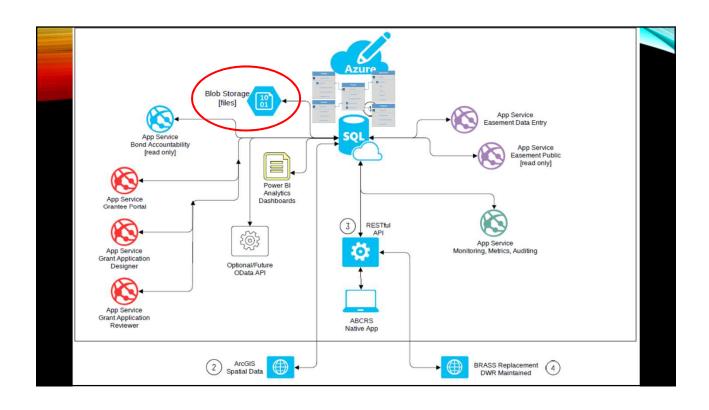
It would simply be infeasible to store all relevant project data across all offices under Agency in a single giant Excel spreadsheet. A relational database avoids this problem by grouping data according to a pre-defined purpose or relevance and then storing it within constituent tables that are linked to one another through a series of matching keys. This inherent flexibility means that Program Staff only deal with information that is relevant to their projects and do NOT have to sort through the entire database to find what they need.



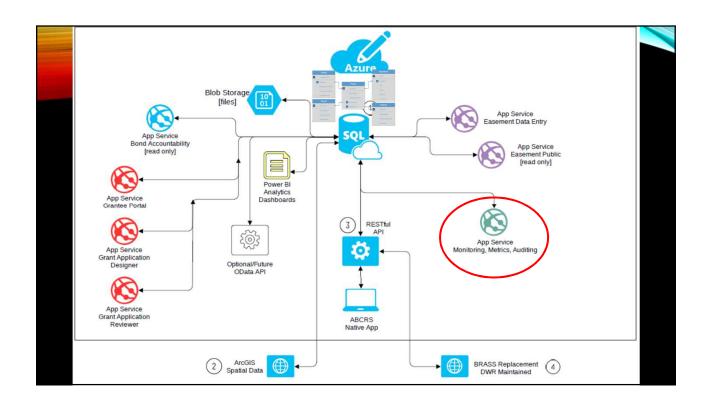
Here is a conceptual diagram of the RAPTR system put together by our IT Development Team. It has a number of different components, but I'd like to focus on just a few of the more pertinent features here. First and foremost, the relational database that will make up the core of RAPTR will actually consist of a small network of interacting database modules (such as ABCRS) that is already being used to track critical bond financing data. The purpose of this modular design is to make it easier to augment or adjust individual data domains within RAPTR without having to re-engineer the entire system - sort of like taking a 'divide and conquer' approach. RAPTR itself, and the data it contains, will be built and stored in the cloud on Microsoft Azure SQL servers.



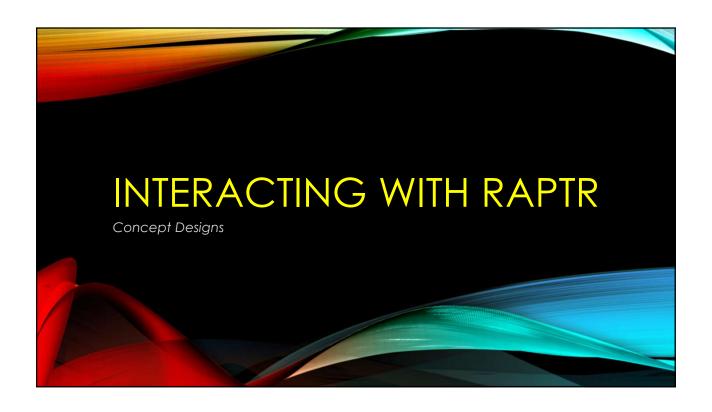
RAPTR will include Grant Application and Management apps that will allow Program Managers to custom design their own online Application Forms as well as manage the resulting application intake, review and scoring. The design of these apps is intended to make the overall application process easier for both Program Staff and Grant Applicants by minimizing redundant data entry as well as building in some basic data QA/QC principles to help ensure the accuracy and completeness of submitted data. For example, RAPTR will establish a single orthodox ID to represent a Grantee Organization so that a staff member who applies for a grant with both CalFIRE and the Sierra Nevada Conservancy won't have to type in their organization's information twice as it will have already been formally registered in RAPTR. In other words, an organization like The Nature Conservancy won't be listed in RAPTR as both 'Nature Conservancy' and 'The Nature Conservancy' with separate contact information.



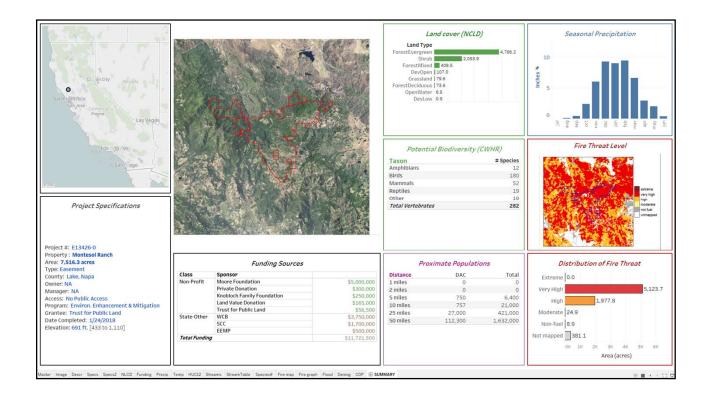
Some project information; like images, legal documents, and multi-media; are not readily amenable to data parsing and decomposition (at least not without a lot more advanced tech). The meta-data for these files will be documented and queriable as standard alphanumeric text within RAPTR, but the actual files themselves will be stored as 'blobs' (or binary large objects) in a separate domain within RAPTR.



A separate app will be developed for Program Staff to define and report project performance metrics as well as any other project monitoring data necessary for evaluating the success of the project during and after its implementation. As a brief reminder, the primary motivation for this particular workshop is to explore how best to evaluate projects aimed at the conservation of aquatic and terrestrial habitats.



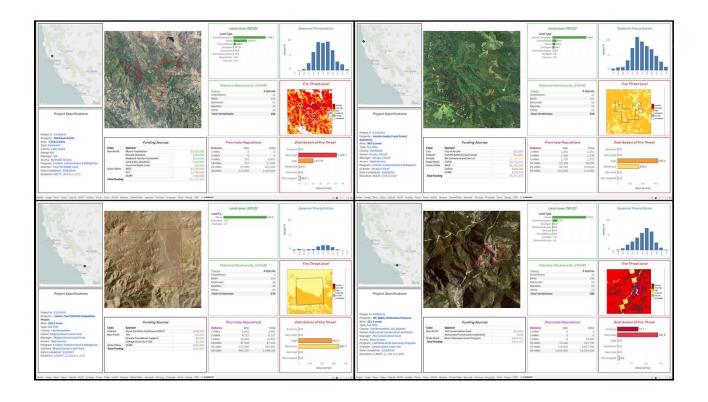
For those of you who are less interested in the general structure of RAPTR, I'd like to present some concept designs of what RAPTR might look like from the perspective of Agency Users. I want to emphasize that these concept designs are not real prototypes for what the RAPTR user interface will look like since we're just beginning the RAPTR development process. We're currently working on the design of these features with our in-house IT development team. What I am showing you today using a combination of Tableau and ArcGIS dashboards are only demonstrations of the kind of functionality that RAPTR could provide Program Staff to assist them with the management of their projects.



Here is an example of what a project profile dashboard might look like to a RAPTR user based on acquisition projects managed by the CNRA Bond Program – in this case a large conservation easement purchased in Napa and Lake counties. It would show key project details such as...

- 1. Where in California the project is located.
- 2. Basic project specifications such as the project #, acreage, grant recipient, amount of funding from the program in question and the current owner.
- 3. A recent high-resolution aerial image of the property and surrounding landscape.
- 4. A full breakdown of the cost-sharing needed to fund the project in its entirety and all the organizations involved in its funding.
- 5. Some basic environmental data to provide the user with some informative context about the project beyond what is reported in project documents such as:
 - A. The distribution of landcover within the project area.
 - B. The biodiversity present within the project area.
 - C. The spatial and scalar distribution of wildfire risk.

Some other panels of interest [not shown] might be a 3-5 sentence description of the purpose of the project as well as a searchable log documenting communication between Program Staff, the Grantee and other subcontractors.

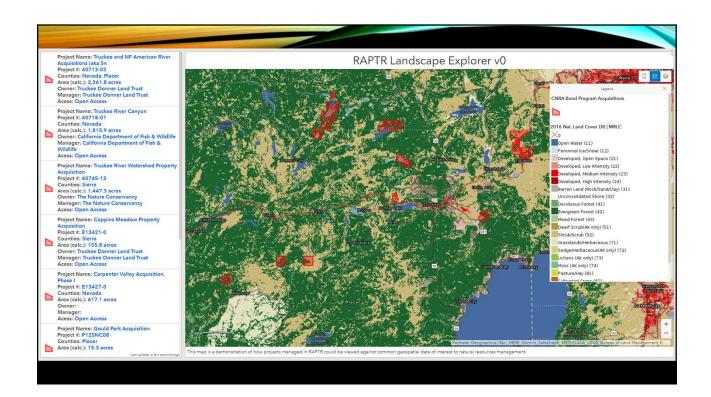


Of course, the development of these dashboards would be supported in part by the scripted automation of data aggregation. That is if it can be done for handful of projects (as shown here in this composite of four different project dashboards), then it can easily be done for 100s or 1000s of projects – all without Program Staff having to manually locate, format and enter this data for each individual project.



Beyond the information provided in a specific project profile, RAPTR users may want to visually explore the spatial distribution of projects based on a specific set of actions implemented, resource assets involved, and/or benefits achieved. And they may want to explore these projects against a backdrop of relevant, publicly available geospatial information. This could help Program Staff evaluate where their projects fit within the existing landscape of environmental, climatic and resource infrastructure data of interest and, therefore, how much added value they derive from that geospatial context.

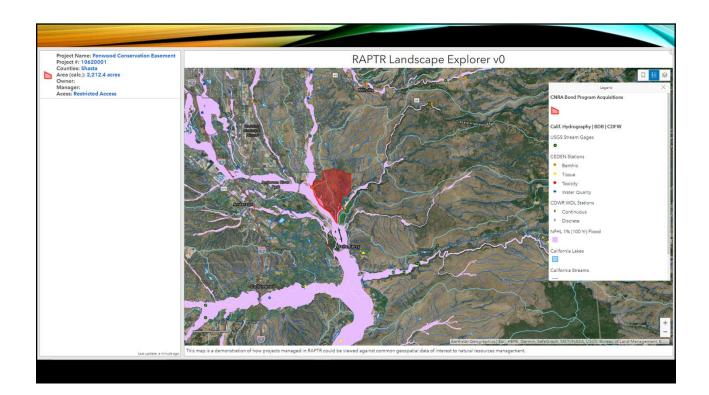
Shown here is the same conservation easement I referred to earlier as well as another large Fee Title acquisition located in Napa county plotted against a map of known conservation easements and protected areas produced by the GreenInfo Network https://www.greeninfo.org/>.



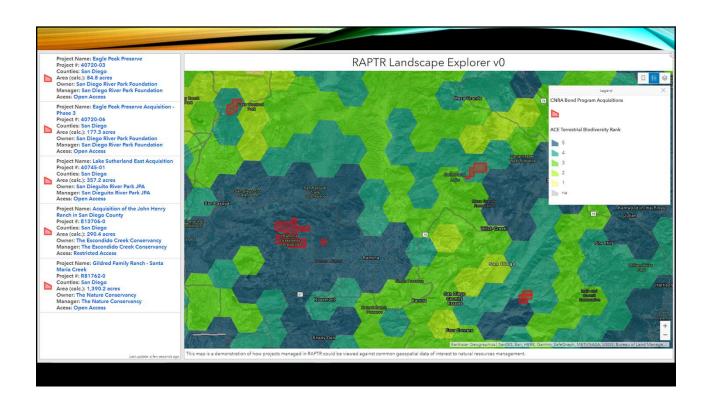
RAPTR could also provide maps on the spatial distribution of land cover in and around the project area to complement the scalar distributions already provided in the project profile dashboard shown earlier. Shown here is the distribution of landcover in the region northwest of Lake Tahoe according to the 2016 National Landcover Database as produced by the Multi-Resolution Land Characteristics Consortium https://www.mrlc.gov/.



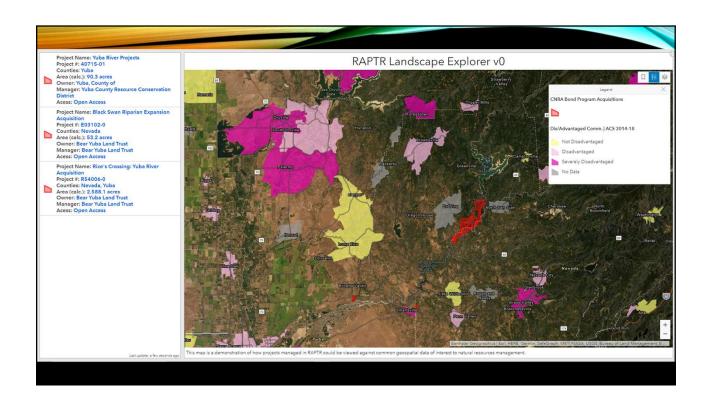
RAPTR could provide maps on the distribution of local water resources including streams, lakes, watersheds, groundwater basins and monitoring stations served by the USGS, DWR and State Waterboards. Shown here are those same data layers as compiled by the Biogeographic Data Branch in State Fisheries and Wildlife https://wildlife.ca.gov/Explore/Organization/BDB.



RAPTR could also provide maps of flood risk such as the 1/100-year flood level boundaries produced by FEMA or other maps preferred by the Division of Flood Management. Show here is the same layer as before, but including the 1/100-year flood level boundaries as documented in the National Flood Hazard Layer produced by FEMA https://www.fema.gov/flood-maps/national-flood-hazard-layer and compiled for California by the Biogeographic Data Branch.



RAPTR could provide maps of terrestrial biodiversity as calculated by Fisheries and Wildlife or another biodiversity model of choice. Shown here is a map of terrestrial biodiversity rank across California as produced by the Areas of Conservation Emphasis program https://wildlife.ca.gov/Data/Analysis/ACE.



Finally, RAPTR could provide information on the communities most proximate to a given project and, therefore, most likely to benefit from it - as well as the economic status of those communities being served. Shown here are maps of Census Data Places (incorporated and unincorporated) color-coded by economic status (Disadvantaged, Severely Disadvantaged, and Not Disadvantaged) based on Median Household Income levels recorded during the 2014-2018 American Community Survey as obtained from the US Census Bureau https://www.census.gov/.

RAPTR SCOPE & CONTENT

RAPTR = Agency Supported Project Data

RAPTR # All Relevant Resource Data

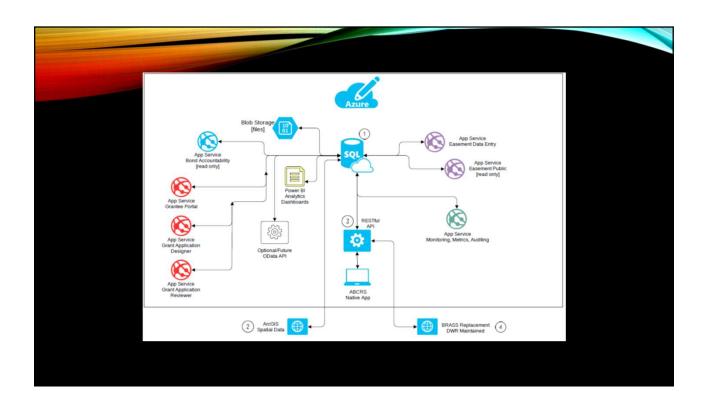
Most of you are probably aware of a number of different environmental databases being hosted by a variety of organizations that cover a wide range of regions and data types. Some of the Program Staff we've been speaking with have noted the overlap between the functionality we're proposing for RAPTR and the functionality of some of the third-party databases they've been using to assist with their work. Not surprisingly, they've wondered how RAPTR differs from the services offered by those databases. That being the case, I'd like to reiterate that RAPTR is focused on capturing data on State projects managed by or funded through Agency offices. It is not designed to be a repository for all environmental, climate and resource data relevant to the implementation and assessment of these projects. In other words...

RAPTR will capture all Agency-supported land acquisitions, but it will not track all fee title purchases made within the State the same way that the California Protected Areas Database currently does.

RAPTR will track all Agency-supported projects aimed at the conservation and restoration of wetland habitats, but it will not track all such restorations made within the State the same way that EcoAtlas currently does.

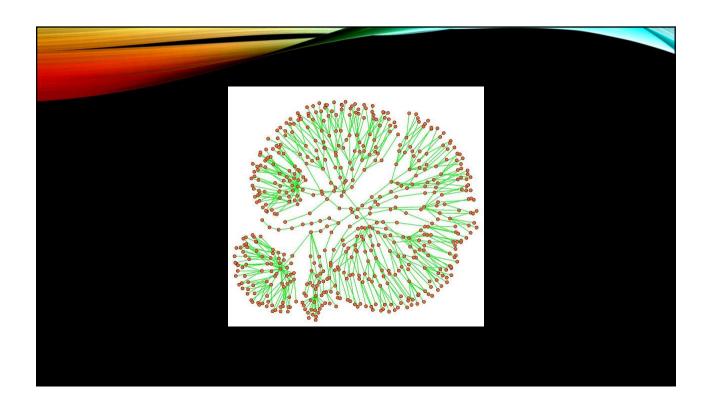
RAPTR will track all Agency-supported projects that result in a major restoration or conversion of the California landscape, but it will not track all such transformations the way that efforts by, say, the Multi-Resolution Land Characteristics Consortium does.

Additionally, I'd like to further clarify that while RAPTR is being specifically designed to manage Agency-supported project data, it will nonetheless provide State programs with the ability to share this project data with other important external data commons as they currently do now (commons like EcoAtlas or the CPAD) – just as RAPTR will leverage other publicly available data sets to assist Program Staff with the management of State projects.



As Gina mentioned earlier in here talk on the RAPTR Development process, the main purpose of RAPTR is to centralize knowledge of the natural resource investments that the Agency is making through its soon-to-be 27 offices and, equally important, fully capture all of the benefits these projects are achieving given their increasingly cross-disciplinary nature (at least from a multi-benefit perspective). However, our motivation for centralizing this information is not just to make project data that much easier to access (and therefore support more transparent data governance), but also make it easier to manage.

So we end up with a tractable database like the one I presented earlier [shown here]...



...rather than this — a complex data network where different suites of data corresponding to different combinations of project types, resource assets and benefit themes are exported to a multitude of external third-party databases on a voluntary basis. And where each external party requires their own data formatting and QA/QC protocols as well as a non-trivial contract to manage the data. This kind of 'free-form' distributed data network poses significant logistic and financial challenges that point to one other motivation for developing RAPTR: the ability to take full advantage of the economies of scale associated with aggregating project data at the Agency level.

RISK OF DATA ATTRITION

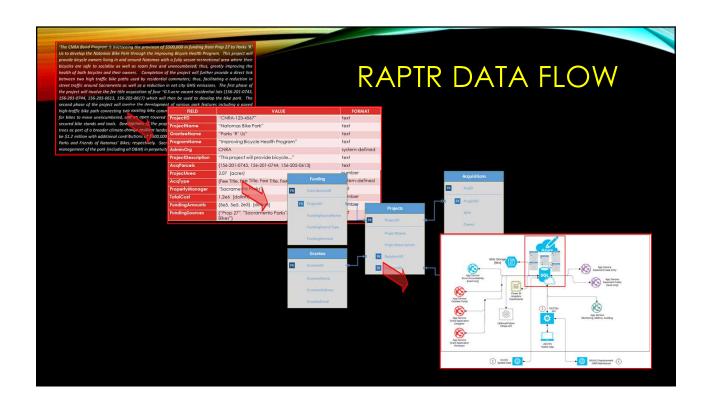
EXAMPLE: CNRA Bond Program Acquisitions

Informal spreadsheet = 116
Database interrogation +55 = 171
'Missing' information -53 = 118
Poor/unconfirm. APN -24 = 94

TOTAL recovered so far = 94/171

Another motivation for creating RAPTR is to help ensure the completeness and accuracy of Agency-supported project data. When project data is stored as Word or PDF documents on individual computers by individual Program Staff, then individual differences in project management style combined with the vagaries of time can result in a natural attrition of project data; even despite the best efforts of Program Staff.

One example of this phenomena is a pilot exercise I'm currently working on with my colleague Brad Juarros cataloging all the Fee Title and Conservation Easement acquisitions purchased by the CNRA Bond Program over the past 20 years. We plan to use this project data to help with the initial testing of RAPTR. For a number of years, the Bond Program had been informally cataloging these acquisitions in a shared spreadsheet passed on from one colleague to the next that, at last reading, listed 116 acquisitions. A more recent interrogation of ABCRS and the Bond Program databases, however, resulted in the discovery of 55 new acquisitions; some of which appeared in one but not both databases. Unfortunately, we were unable to identify the parcels purchased for 53 of these acquisitions in a subsequent data mining foray. To be fair, more often than not this data is not truly 'missing' but located somewhere that isn't entirely obvious to staff not immediately familiar with the project. Nonetheless, of the remaining 118 projects with easily recoverable parcel data, 24 projects had discordant or otherwise unconfirmable parcel data when compared against existing county parcel GIS data. Thus, at present only 94 out of 171 acquisitions have confirmable acquisition geometries - or roughly half of the Bond Program's total acquisitions to date. We're hoping that Brad, along with the help of his colleagues, can ferret out some of this 'missing' project data. We're also hoping that GreenInfo can help us more precisely define the geometries of these acquisitions until a more formal procedure for submitting geospatial data into RAPTR can be put into place. Given how diligent and attentive to detail CNRA Bond Program Staff are known to be, we suspect that this kind of data attrition is likely occurring elsewhere within the broader Agency.



One of our primary strategies in developing RAPTR is to ensure the completeness and accuracy of recorded project data is to gather it as early as possible, likely when the grant agreement or contract is finalized and the expectations of the funding recipient in terms of deliverables and performance metric targets are formally defined. In doing so, we hope to avoid the classic 'fire drill' that occurs when there is a request to retroactively aggregate this information years after these agreements have been written and the projects completed. We hope this approach will not only help ensure the accuracy and completeness of project data but, at the same time, help Program Staff better track the short- and long-term benefits of the project as promised by the corresponding grant agreement or contract; thus, fulfilling the major design objectives for RAPTR.

ACQUISITIONS & EASEMENTS 2020 RECAP BRAD JUARROS, ENVIRONMENTAL SCIENTIST

- Integrated California Conservation Easements Database (CCED) to the California Protected Areas GIS Dataset (CPAD)
- A&E Workshop July 15, 2020 and Working Group
- Added a Map Collaborator Tool

The California Protected Areas Database (CPAD) is a GIS dataset depicting conservation lands and open space protected in fee title or conservation easement, which we anticipate will ultimately be integrated with RAPTR when RAPTR comes online. However, we are laying the ground-work today to get an accurate inventory of conservation lands prior to migrating the GIS dataset to RAPTR in the future.

In 2020 conservation easements were added to the GIS dataset. Prior to May of 2020 only fee title properties were viewable in GIS. Now you can view fee title or conservation easements as separate layers or in combination.

CPAD Statistics for 2020

- Added approximately 67,000-acres (Approximately 32,500-acres were conservation easements)
- Acres by Agency Type of those added in 2020:

Federal - 35,362 State - (-21,211) County - 2,909 City - 5,660 Special District - 14,352

Non-Profit - 30,005

Acres by Access Type of those added in 2020:
 Open Access - 64.9%
 Restricted Access - 17.8%
 No Public Access - 17.3%

2020 may have been a terrible year in many respects, but in terms of updating our inventory of protected areas, it was a productive year.

- We added approximately 67,000-acres, slightly less than half were conservation easements and about 51% were fee title. To give you some reference of how much area this is, the Humboldt Redwoods State Park is about 54,000-acres. And if you noticed the negative value for the state. This is the result of properties that were either transferred to another entity for long term stewardship or were assumed to be state owned. One of the things we're working on is not only to develop an accurate inventory of conservation lands, but also who holds title to the property, or conservation easement, which can change over time.
- In terms of access, about 65% of the area added for 2020 is open access, and in terms of Agency type, almost 45% of acreage was added by non-profits.
- The additional acreage included 44 of 58 counties and 105 cities.
- By the way the top three conservation easement holders in California are The Nature Conservancy, California Rangeland Trust and U.S. Fish & Wildlife.



The new Map Collaborator contains the same datasets as CPAD, including conservation easements, however the Map Collaborator offers more viewing options, and it has some features that may be helpful to you with planning exercises or when evaluating proposals.

- 1) In the upper right you can change the base layer to one of several options such Google photos, or Bing streets, or topographic etc.
- 2) Just below that is the "Share this map with others" feature. It's hard to see, but it's the links icon. That generates a URL that can be shared with others. It will take them to the same location on the map and turn on/off layers so that they see the same view.

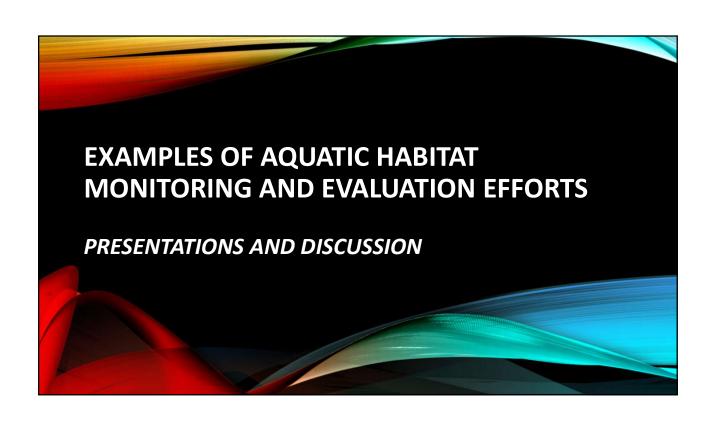
The banner on the left has a zoom function that allows you to type in an address, or landmark and it takes you there similar to Google Earth. Or you can search properties by county, by agency, or non-profit organization. And one final feature to wrap this up. The Notes feature just below Search. Again, a little hard to see but the little paper clip in the center of the map. The paper clip points are where users can add notes tied to a specific location. If you were reviewing an area, you could place a note and attached text for others to view and read.

One potential workflow might be to place pin(s) with notes you want to run past a colleague. You could then share a link that loads the webpage to that location and has the layers you would like them to view. This may be helpful when looking at an area that perhaps is high priority.

MORE INFORMATION

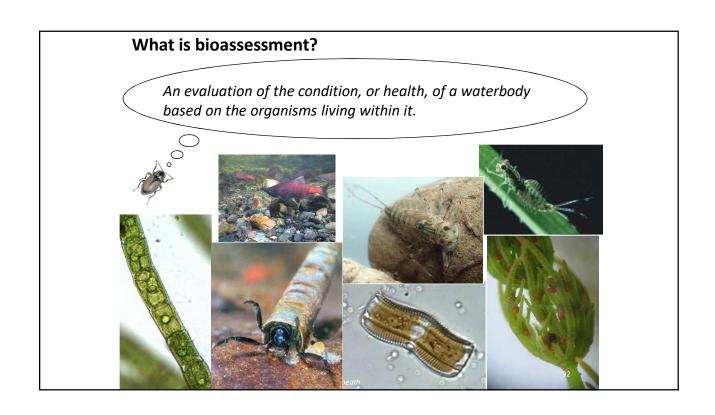
- More information about CPAD: https://www.calands.org/
- More information about Map Collaborator: http://www.mapcollaborator.org/demo/
- If you're interested in being part of the working-group send me an email (on next slide)



















Why bioassessment?

Streams and rivers provide many benefits to humans

- Clean drinking water
- Places to fish
- Places to swim
- Support diverse native wildlife

Clean Water Act (CWA) § 101(a) (1972, et seq.): "The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters."

In order to restore and maintain biological integrity, we have to be able to measure it

Benthic Macroinvertebrates (BMIs)

Bottom-dwelling invertebrates, not microscopic

Diverse and abundant: Dozens to > 100 BMI species present at a site, thousands of individuals/m2

Unique preferences for different micro-habitats: physical settings, but also different sensitivities to pollutants, sediment, flow alteration, etc.











Key Components of How We Measure and Assess Biological Integrity:

- Standard field and lab methods (plus other infrastructure components like data management & quality assurance)
- •The Reference Condition Monitoring Program (RCMP): reference conditions help us set benchmarks and are the core of building interpretive indices
- The Perennial Streams Assessment (PSA): statewide stream survey that allows biological condition estimates for all wadeable stream length in CA.

Standard field methods: every bioassessment site is sampled for biological, chemical and physical habitat indicators.

Biological Indicators:

- Benthic macroinvertebrates
- Diatoms
- Non-diatoms (i.e., "soft" algae)

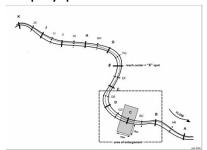
Chemical Indicators:

- Nitrogen
- Phosphorous
- Chloride
- Total Suspended Solids
- etc

Physical Habitat Indicators:

- Riparian vegetation complexity
- In-stream habitat complexity
- Substrate composition
- Local riparian disturbance
- Canopy density
- etc.

Standardized sampling reach divided into equally-spaced transects



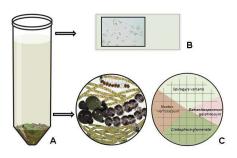


Standard lab methods:

For both BMIs and algae, we have standard methods for:

- Washing and preparing samples for identification
- Subsampling the original "total" sample into the portion that will be identified
- Recommended levels of taxonomic identification (i.e., "Standard Taxonomic Effort")
- Suggested literature best suited for identification of different groups





All of these methods are well-supported and well-documented in numerous Standard Operating Procedures (SOPs)



...well supported by extensive quality control (QC) measures

- External QC for BMIs
- External QC for algae
- Field audits and calibrations for field crews





...well supported by online resources

- Video modules that demonsrate field protocols
- Photographic libraries of taxonomic identifications

The Reference Condition Monitoring Program (RCMP)

Reference sites are healthy stream reaches that define a benchmark of expected biological, chemical and physical conditions when human disturbance in the environment is absent or minimal.

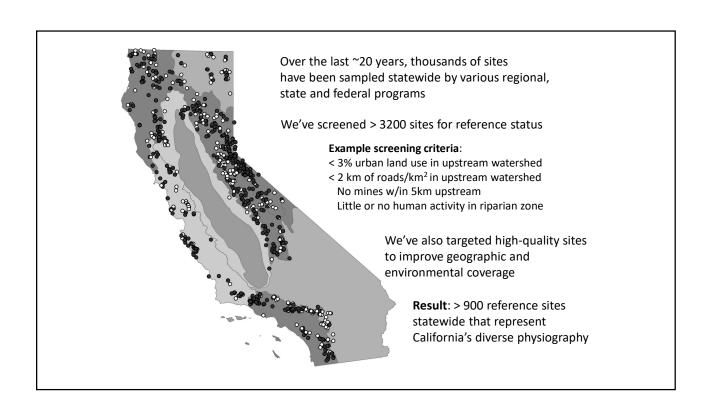
This benchmark, known as **the reference condition**, is the foundation of any bioassessment program:

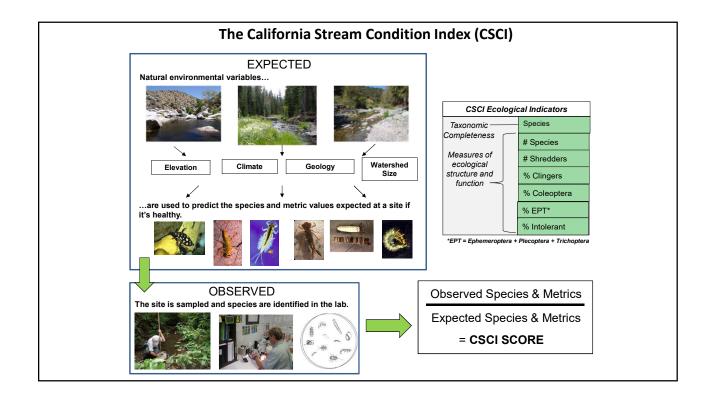
- sets the standard for evaluating results from compliance and ambient monitoring
- provides meaningful objectives for stream restoration
- establishes a framework for protecting our healthiest streams and rivers
- provides a basis for assessing potential effects of climate change on streams

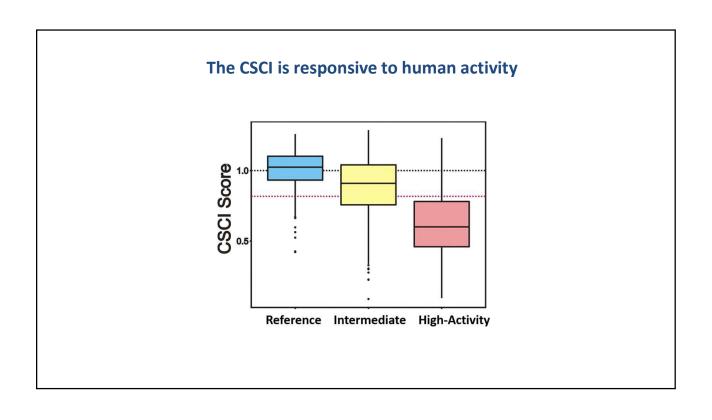


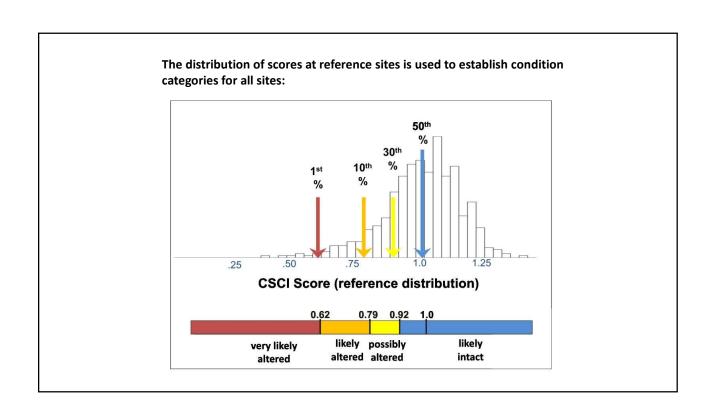


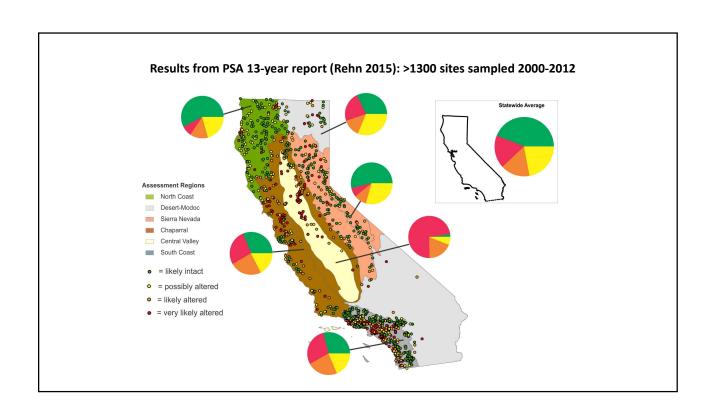


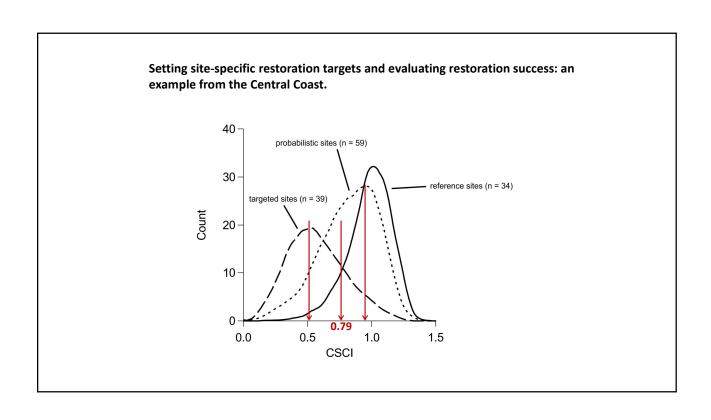






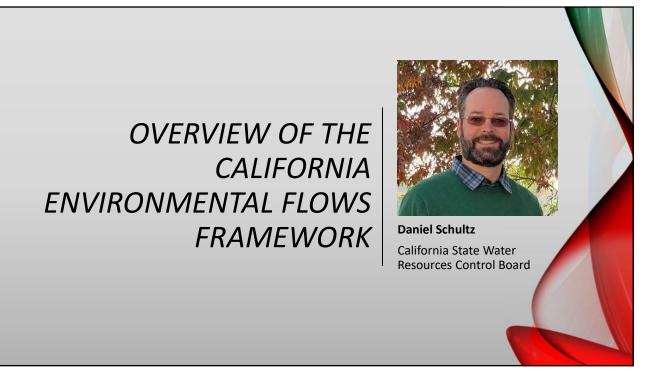






Conclusions/Lessons Learned

- Consistent and standardized data sets are key to evaluating project success.
- There needs to be a robust way of setting expectations: a pool of reference sites is ideal, but alternate methods may be required in highly constrained settings.
- Thresholds may be scientifically justifiable but are based on the best professional judgement of a relatively small group of people. Alternate thresholds may produce equally valid assessments.



Overview of California Environmental Flows Framework

California Natural Resources Agency Aquatic Habitats Workshop



















Daniel Schultz State Water Board Division of Water Rights February 23, 2021

California Environmental Flows Framework

Prepared by:

California Environmental Flow Working Group, a committee of the California
Water Quality Monitoring Council

Funded by:

State Water Resources Control Board, Division of Water Rights

November XX 2020



CEFF TECHNICAL TEAM

- Alyssa Obester CA Department of Fish and Wildlife
- Amber Villalobos CA Department of Fish and Wildlife
- Belize Lane Utah State University
- Bronwen Stanford CA Department of Fish and Wildlife
- Daniel Schultz State Water Resources Control Board
- Eric Stein Southern CA Coastal Water Research Project
- Jeanette Howard The Nature Conservancy
- Julie Zimmerman The Nature Conservancy
- Kris Taniguchi-Quan S. CA Coastal Water Research Project
- Robert Holmes CA Department of Fish and Wildlife
- Rob Lusardi CalTrout
- Sam Sandoval-Solis University of California, Davis
- Samuel Cole State Water Resources Control Board
- Sarah Yarnell University of California, Davis
- Ted Grantham University of California, Berkeley

Environmental flows

<u>Environmental flows</u> describe the quantity, timing, quality of water allocated to the environment to sustain the health of freshwater ecosystems, which in turn, support human cultures, economies, sustainable livelihoods, and well-being.

- modified from Brisbane Declaration 2018

The Need for a Statewide Framework

- Many programs are attempting to set environmental flows, however,
 - California is diverse with different species, hydrology, and environmental flow needs
 - Environmental flow approaches have been inconsistently applied and poorly coordinated
- Other challenges include:
 - Uncertainty in which methods are most appropriate
 - Communicating with the public

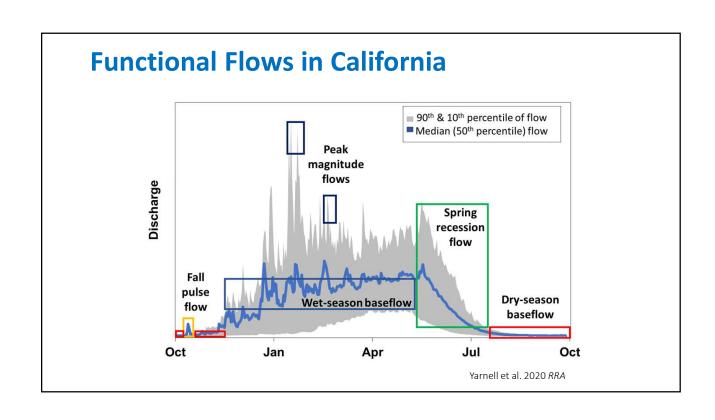
CA Environmental Flows Framework (CEFF)

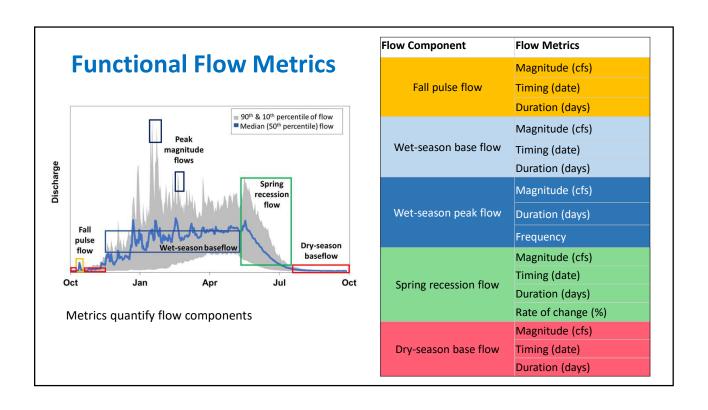
Provides technical guidance for managers to develop scientifically defensible environmental flow recommendations following a functional flows approach.

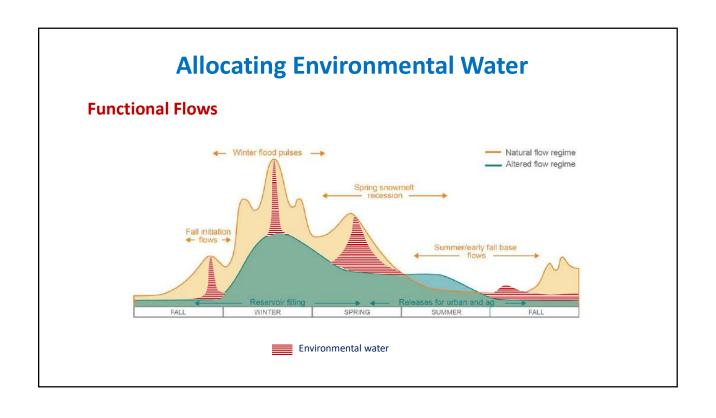
Quantifying ecological flow needs with CEFF

- CEFF uses a "functional flows approach"
- Focuses on components of a river's flow that support critical biological, chemical and physical functions





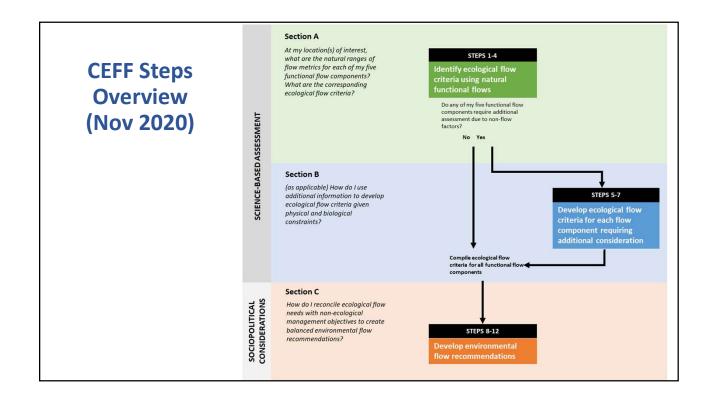


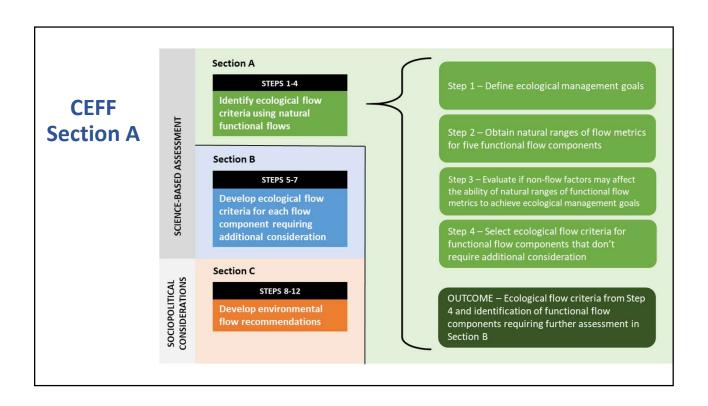


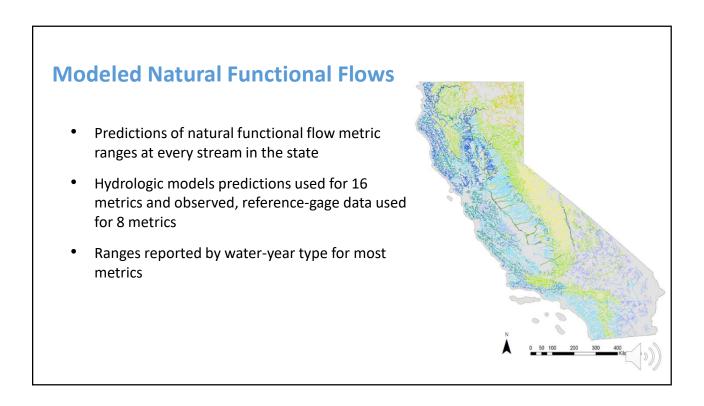
CEFF Definitions

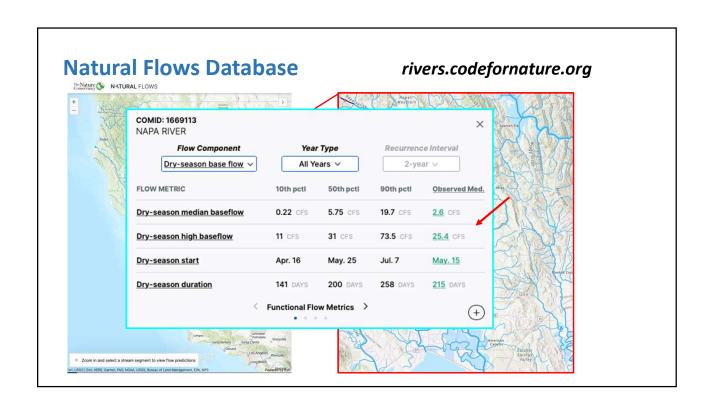
Ecological flow criteria: metrics that describe the range of flows that must be maintained within a stream and its margins to support the natural functions of healthy ecosystems

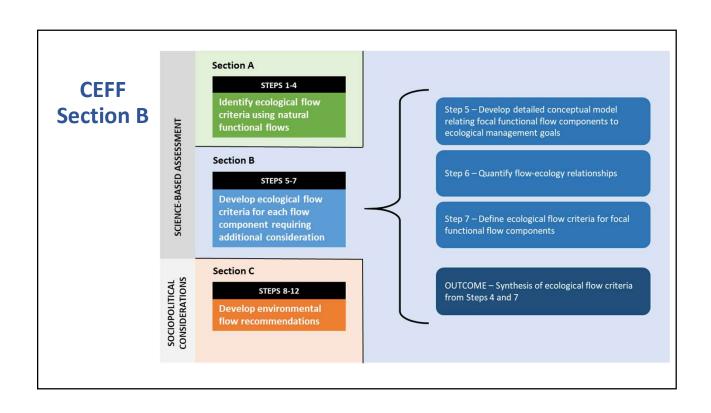
Environmental flow recommendations: metrics that consider human uses and other management objectives along with ecological flow criteria

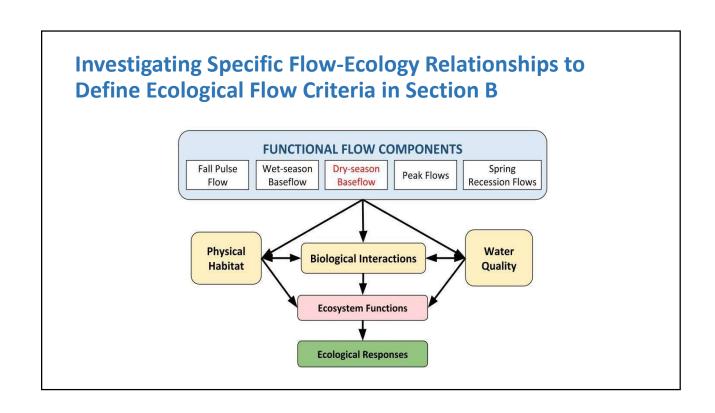


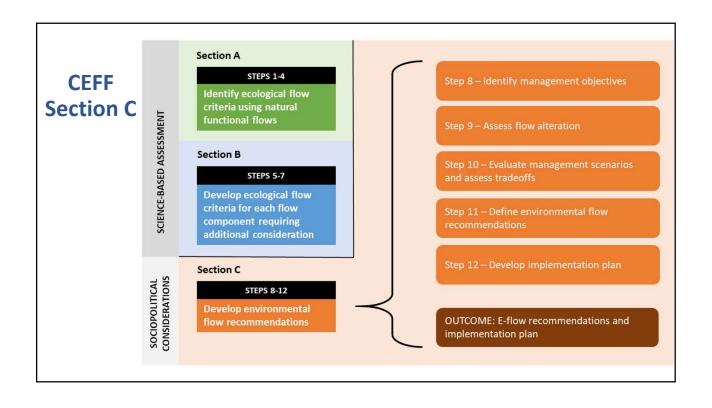


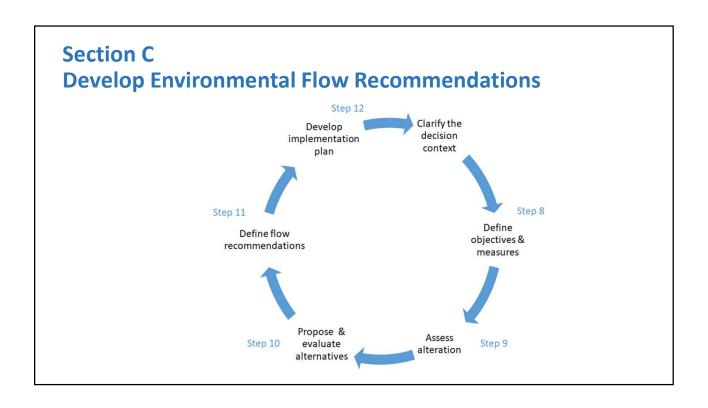












Outcomes of CEFF as Described in Guidance Document

- Ecological flow criteria for areas of interest
- Environmental flow recommendations (via stakeholder process)
- Recommended mitigation measures (via stakeholder process)
- Implementation, monitoring and adaptive management plan
- Online tools:
 - natural flows database/web viewer (rivers.codefornature.org)
 - functional flow calculator (eflows.ucdavis.edu)
 - information repository (ceff.ucdavis.edu)

Next Steps

Release Final CEFF Document and Frequently Asked Questions

• Spring 2021

CEFF is a "living document"

Multiple case studies under development

- North Coast water diversions
- Eel River dam relicensing and reoperation
- Southern California flow requirements for water quality

RAPTR – Measuring Effectiveness through CEFF

Research and Planning Grants

• CEFF does not establish standards, but does provide a process to develop environmental flows (standards) through a stakeholder driven process

Project Implementation Grants

- Section A Natural Flow Metrics could be used directly to inform benefits of non-contentious flow enhancement projects
 - Example Shifting small scale dry season diversions to wet season diversions to offstream storage
- Ecological flow criteria and environmental flows developed using CEFF through research and planning grants or other process could be used to measure effectiveness of grants for more complex or contentious flow enhancement projects
 - Example Large restoration projects or other management activities to offset impacts of large-scale water management projects

Additional Resources

- <u>ceff.ucdavis.edu</u>
- <u>rivers.codefornature.org</u>
- mywaterquality.ca.gov/monitoring council/environmental flows workgroup























Need for Wetland Regional Monitoring

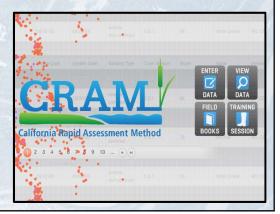
- Compare projects across the state within our agency & between agencies
- Sea Level Rise and other climate change stressors increasing monitoring needs
- The State must understand how wetlands are faring to provide resilience
- Monitoring information can support high level funding & management decisions
- · Individual projects cannot answer all the questions for the State





Why CRAM?

- Widely used nearly an industry standard
- Relatively inexpensive ~\$2,000 per Assessment Area
- Easily and quickly done 2-3 people over the course of I day
- Many trained practitioners across the state
- · Scientifically defensible
- Standardized
- Project data can be accessed on EcoAtlas



Does it replace monitoring programs? No! Photo credits: SFEL

SCC's CRAM Requirement

- Started in 2016
- All wetland projects with appropriate CRAM modules
- Pre- and post- construction surveys
- Simple invasive species removal projects not required
- Small (i.e. 0.1 hectares) projects not required

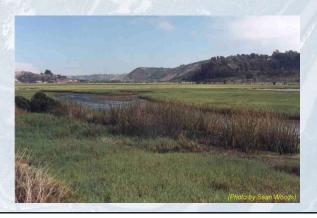


How will SCC use CRAM? At the project level: High-level project success Identify additional monitoring Adaptive management needs Habitat evolution Helping project leads make site specific decisions Regional context Habitat Development Curve for Southern Ca

How will SCC use CRAM?

At the agency level:

- Demonstrate SCC's impact to improved wetland condition and resiliency
- Important for advancing science & better project design
- Wetland project comparisons across:
 - State
 - SCC regions
 - Wetland types
 - Agencies



Advancing regional monitoring...

- Build upon existing systems
- Financial support
- Lead management agencies



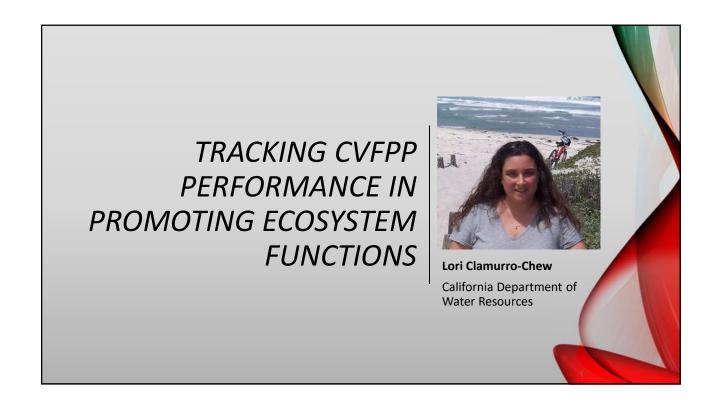




THANK YOU! Questions?

Evyan Borgnis Sloane Evyan.sloane@scc.ca.gov





CALIFORNIA DEPARTMENT OF WATER RESOURCES

Tracking CVFPP Performance in Promoting Ecosystem Functions

RAPTR Workshop, February 23, 2021



Lori Clamurro Chew, DWR

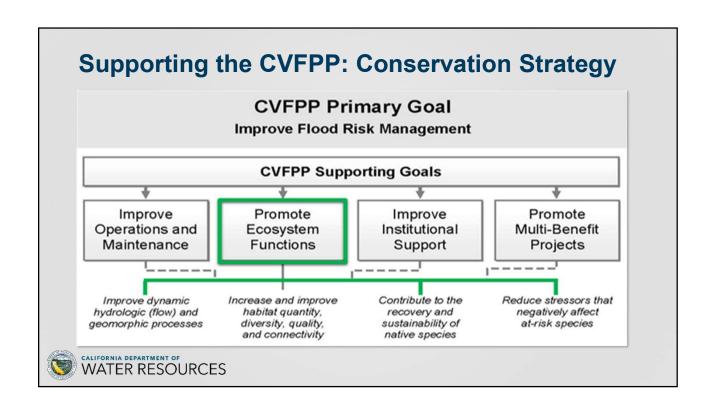
CVFPP Background

2008 Central Valley Flood Protection Act

(Water Code Sections 9600-9625)

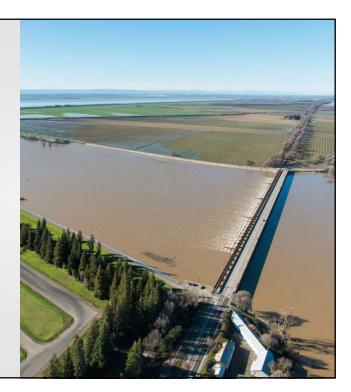
- Mandated adoption of a Central Valley Flood Protection Plan, to be updated every five years (Water Code Section 9612)
- Identified multiple objectives for improving flood system performance (*Water Code Section 9616*), including
- · Promote natural dynamic hydrologic and geomorphic processes
- Increase and improve the quantity, diversity, and connectivity of riparian, wetland, floodplain, and shaded riverine aquatic habitats, including the agricultural and ecological value of these lands
- Promote the recovery and stability of native species populations and overall biotic community diversity







- Climate resilience
- Report project implementation accomplishments and outcomes (performance tracking)
- · Alignment with other State efforts





Why Tracking is Important

- Assessing progress toward Conservation Strategy Measurable Objectives
- Respond to inquiries from legislators, funders and others about activities
- Create basis for adaptive management and learning





2017 CVFPP Recommendations on Performance Tracking

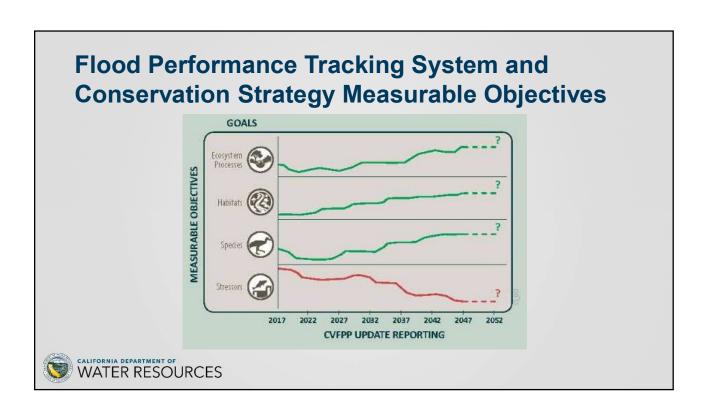


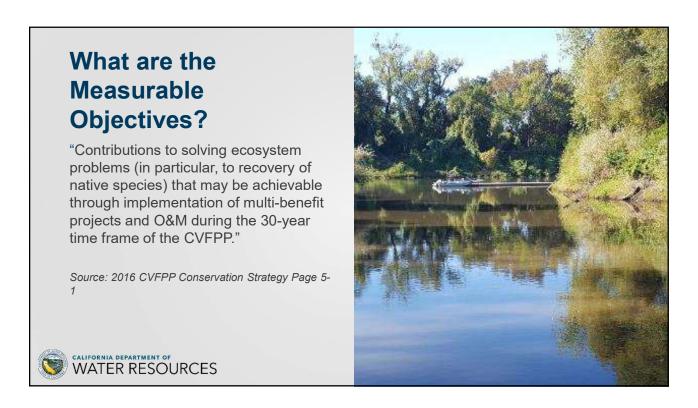
Track outcomes from flood investments to demonstrate value.



Monitor and track outcomes of multi-benefit projects over time.







2016 Conservation Strategy

Ecological Goal	Targeted Ecosystem Process, Habitat, Species, or Stressor
Ecosystem processes. Improve dynamics hydrologic and geomorphic processes.	Floodplain inundation
	Riverine geomorphic processes
Habitat. Increase and improve quantity, diversity, and connectivity of riverine and floodplain habitats.	SRA cover
	Riparian
'	Marshes and other wetlands
Species. Contribute to the recovery and sustainability of native species populations and overall biotic community diversity.	Targeted species
Stressors. Reduce stressors related to the development and operation of the SPFC that negatively affect at-risk species.	Revetment
	Levees 1
	Fish passage barriers
	Invasive plants

Key: SPFC = State Plan of Flood Control; SRA = Shaded Riverine Aquatic

Note: 1 In particular, levees are a stressor where located within river meander zones or if their design does not provide sufficient capacity for riparian habitat throughout the floodway



Source: 2016 CVFPP Conservation Strategy Page 4-1

Basis of Measurable Objective Amounts (1 of 2)

As developed in collaboration with the CVFPB Conservation Strategy Advisory Committee:

- 1. Estimated need and opportunities
 - Size of conservation need (i.e. amount needed by target species)
 - Size of opportunities for multi-benefit flood projects to contribute to need
- 2. Opportunities based on:
 - · Basin-Wide Feasibility Studies
 - Floodplain Restoration Opportunity Analysis (FROA)
 - · Other potential opportunities

(Cont.)

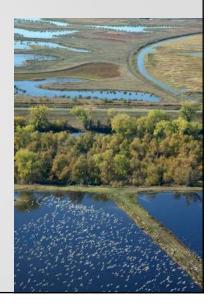




Basis of Measurable Objective Amounts (2 of 2)

As developed in collaboration with the Advisory Committee:

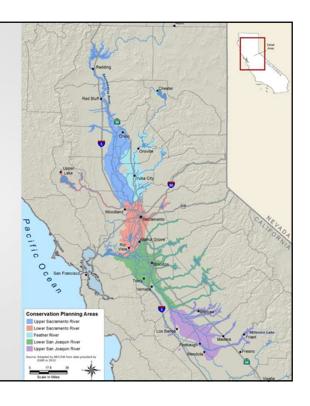
- 3. Not included as opportunities
 - Areas outside of CVFPP Systemwide Planning Area
 - · Multi-benefit projects already built
 - Non-CVFPP projects in Delta (e.g. through North Delta Program)
 - Anticipated mitigation acreage associated with flood system
- 4. Measurable objective quantity equals **need** or opportunity, whichever is smaller WATER RESOURCES



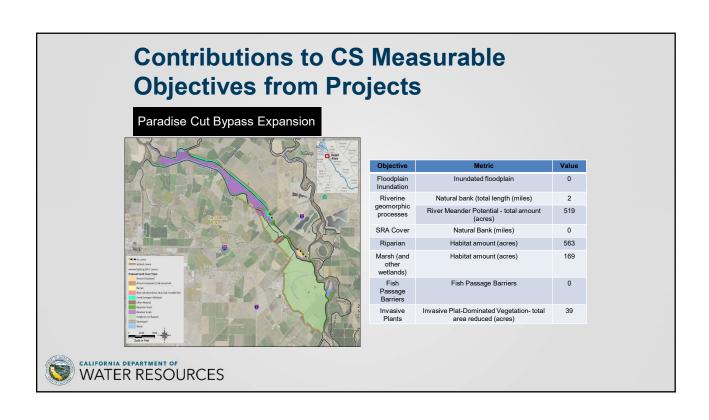
CVFPP Conservation Strategy: Conservation Planning Areas

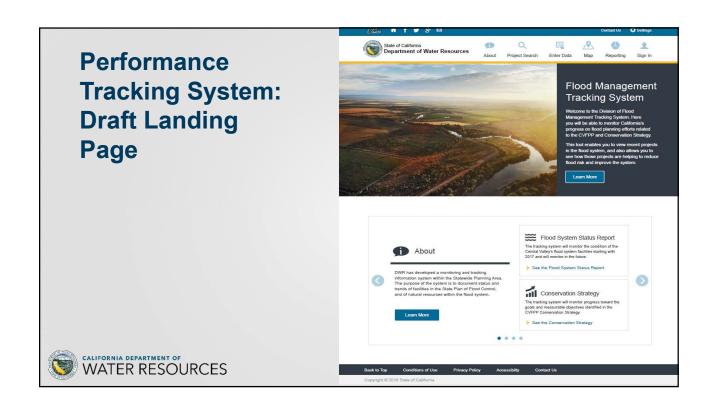
- Mid-Upper Sacramento River
- Feather River
- Lower Sacramento River/Delta North
- Lower-Mid San Joaquin River/Delta South
- Upper San Joaquin River

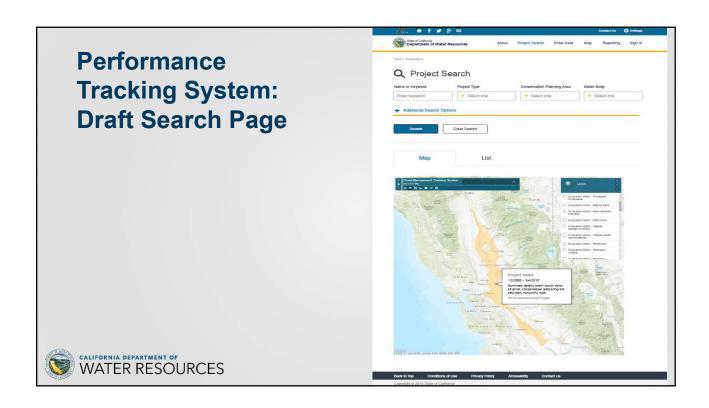


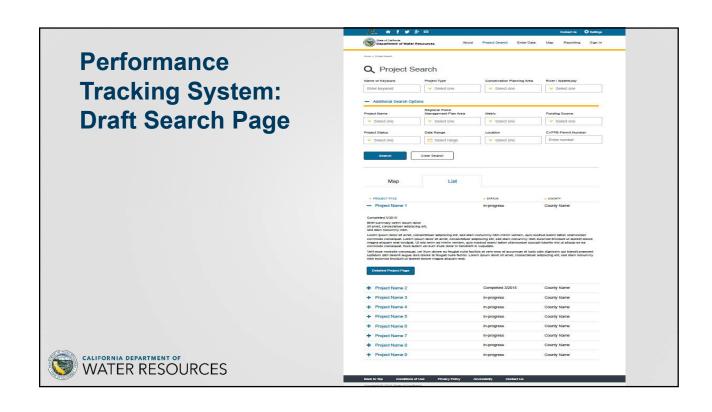


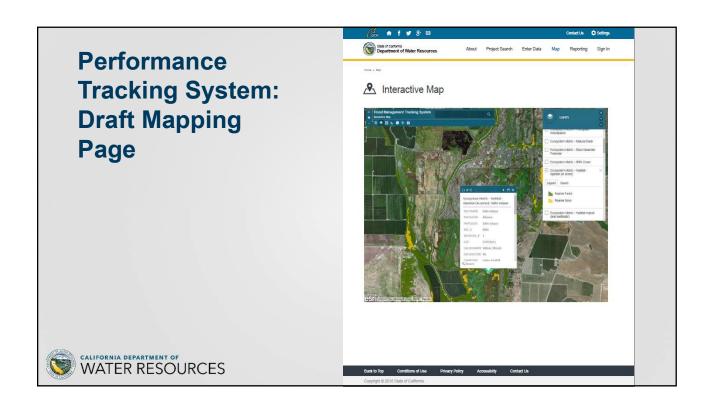
Targeted Process, Habitat, Species, or Stressor	Metric	Mid-Upper Sacramento River CPA	Feather River CPA	Lower Sacramento River/Delta North CPA	Lower-Mid San Joaquin River/ Delta South CPA	Upper San Joaquin River CPA
Ecosystem Processes						
Floodplain Inundation	Inundation Floodplain - major river reaches (acres)	6,300 acres	3,700 acres	7,650 acres	11,600 acres	2,800 acres
	Inundation Floodplain – bypasses/transient storage areas (acres)	9,600 acres	N/A	7,500 acres	200 acres	0 acres
Riverine Geomorphic Processes	Natural Bank – total length (miles)	20 miles	0 miles	4 miles	13 miles	8 miles
	Riparian-lined Bank (miles)	5,600 miles	400 miles	1,300 miles	4,300 miles	2,100 miles
Habitats						
SRA Cover	Natural Bank (miles)	20 miles	0 miles	4 miles	13 miles	8 miles
	Riparian-lined Bank (miles)	8 miles	0 miles	3 miles	6 miles	2 miles
Riparian	Habitat Amount – total amount on active floodplain (acres)	3,400 acres	1,800 acres	1,900 acres	5,800 acres	2,100 acres
Marsh (and other wetlands)	Habitat Amount – total amount on active floodplain (acres)	2,400 acres	0 acres	3,500 acres	100 acres	0 acres
Stressors						
Fish Passage Barriers	Fish Passage Barriers – priority barriers modified or removed	5 barriers	0 barriers	4 barriers	TBD	TBD
Invasive Plants	Invasive Plant-Dominated Vegetation – total area reduced (acres) or DWR- maintained land/facilities	268 acres	257 acres	363 acres	34 acres	143 acres











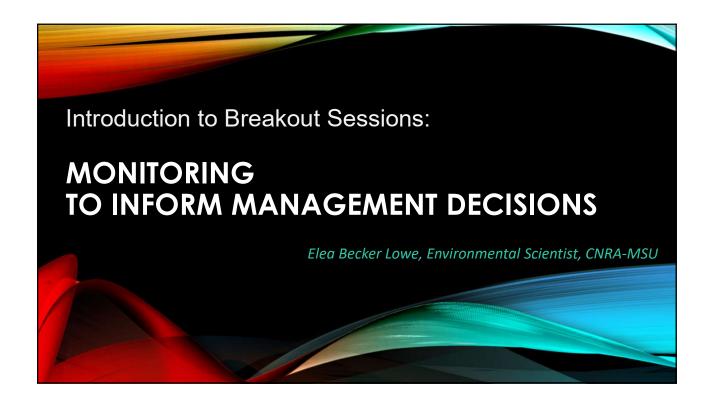


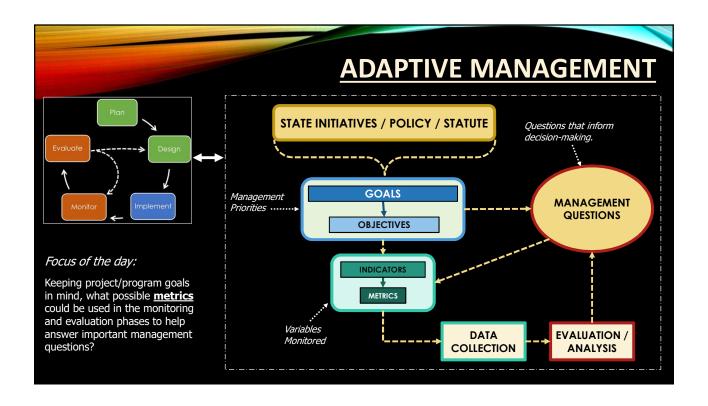












These images are meant to show the project lifecycle from an **adaptive management** perspective. The leftmost figure looks the **project phases**, from planning and design to implementation to monitoring and evaluation. Depending on how effectively the project appears to be achieving its intended outcomes during the evaluation phase, it continue to be regularly monitored unless some detected change to the variables tracked indicates a need to adjust the management approach, taking the project back to the design or implementation phases.

The diagram on the right zooms out a bit to look at how project-level priorities can be informed by high-level initiatives or directives. Once goals and more actionable objectives are established and a proposed intervention is applied to the project to achieve those objectives, we can start to look at management questions and particular measurable attributes that would indicate important changes to the status or condition of a project site over time. This diagram is meant to represent the feedback loop showing that the metrics tracked are both formed by and should eventually inform answers to management questions about the project area or project features.

The project design and implementation process should consider **SMART criteria**, meaning that we want to inspire management questions, objectives, indicators and metrics that are **specific**, **measurable**, **achievable**, **representative**, **and time-bound**. With SMART criteria in mind, we're also going to need to screen the metrics further against other criteria to gauge: feasibility and appropriateness, technological needs and expertise needed, capacity for data collection, cost effectiveness, and other important factors. Much of that process will take place after the workshop series with subject matter expert leads.

PROJECT MANAGEMENT QUESTION -

DID THE PROJECT OR ACTION GENERATE THE DESIRED EFFECT(S) / OUTCOME(S)?

Example 1 – Has biodiversity increased as a result of the project?

This question leaves room for detail about what to monitor: Scope? Time scale? What changes to biodiversity are of interest? What species are particularly significant?

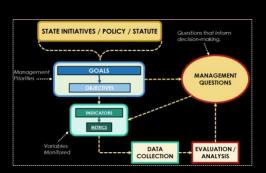
Example 2 – How does the number and proportions of tree species observed on [X project site] change annually after implementing [Y] management activity] as compared with baseline conditions?

This question gives a time interval, a specific range of variables to measure, and what to measure (number of distinct species and populations of each).



OPPORTUNITY FOR INPUT

- Metrics and Methods that matter
 - Metrics that reflect our values and priorities.
 - Metrics that measure project performance over time.
 - Metrics that can inform and harmonize project-, program- and agency-level analysis.
- Existing tools, systems, and methodology that could be leveraged, not recreated.
- The information, analytical capabilities, and project management resources you need to conduct your work most effectively.



BREAKOUT #1

Performance Metric Discussion Guide:

- Describe the purpose/objective/goals of your program.
- How do you determine if your work was successful?
 - Please list the specific variables (metrics) that you track to determine success.
 - Where applicable, please list the methods for monitoring used.
- What additional data could help inform the achievement of your project/program goals?
 - Please list any particular metrics you would like to track that you don't already monitor.
 - Please tell us about other existing databases or systems that we might be able to leverage in pursuit of your stated metrics of interest.



RAPTR Discussion Guide:

- What other opportunities could the RAPTR System help to achieve?
 - Please describe how the RAPTR System could be used to inform State programs and decision-making.
- What potential challenges or concerns [other than financial and staff capacity] should be considered throughout the system development and roll-out phases?
 - Please describe your concern and any suggested solutions you have.

